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(54) Home Bathing Unit

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BACKGROUND OF THE INVENTION

The present invention relates to bathing devices, and in particular to a bathing unit specifically designed for home use.

Bathing units for invalids confined to hospitals, nursing homes, convalescent and retirement centers, and other similar institutions are presently available, and generally comprise a bathtub with some type of lifting device to transfer the patient from a wheelchair or gurney into the bathtub.

A novel apparatus and method for bathing invalids is disclosed in our prior United States Patent Nos. 4,346,485; 4,446,586; 4,365,367; 4,399,569; and 4,439,877. This apparatus includes a lateral access opening in one side of the bathtub to facilitate transferring the invalid into and out of the bathtub, and a vertically sliding door to selectively close the access opening. The bathing unit is particularly adapted for bathing invalids, and others with impaired ambulatory ability, and requires the aid of an assistant or attendant. The door lock is a manually operated, mechanical device that is operated from outside of the bathtub by an assistant. Also, the control panel for the



1 water controller is located at the foot end of the
bathtub, away from the seat area, so that the controls are
designed to be manipulated only by an assistant. The
bathing unit has a special toe space, and a notch in the
5 door which make it easier for the assistant to reach into
the bathtub to bathe the invalid. Furthermore, the
bathtub seat is at the level of a conventional wheelchair,
and one side of the seat is fully open, so that the
assistant can shift the patient between the bathtub and a
10 wheelchair with a natural, unstrained swinging motion,
which permits the attendant to keep his feet fixed on the
floor, and maintain the weight of the invalid close to his
body to minimize muscle strain. The bathtub door can be
raised to a fully overhead position, so that it is not in
15 the way when the assistant transfers the patient between
the bathtub and the wheelchair. All of these features
assist the attendant in providing complete and thorough
bathing of the invalid, while minimizing strain and effort
on his part.

20 The present bathing unit is particularly designed
for home use, and does not require the help of an
attendant, or other assistant. The bather can operate the
bathing unit by himself from a seated position within the
bathtub. The unit provides heated, whirlpool bathing,
25 which is becoming increasingly popular among people of all
ages. The unit can also provide hydrotherapy, which is
particularly useful for minor muscle aches, and other
self-health care, as well as for the elderly. Since the
services of an attendant are not required to bathe in the
30 present unit, the bather can maintain privacy, if the
bather so desires.

SUMMARY OF THE INVENTION

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One aspect of the present invention is a home bathing unit, comprising a bathtub having opposite sidewalls and end walls, with an access opening in one of the sidewalls for ingress and egress therethrough. A seat is located in the bathtub adjacent to one of the end walls, and a door selectively closes the access opening. A mechanism is provided for vertically guiding the door between a fully open position wherein bather movement through the access opening is permitted, and a fully closed position wherein the door sealingly closes the access opening. The door has a lock mechanism to securely lock the door in the fully closed position. A lock actuator is operably connected with the lock, and is positioned to be manipulated by a bather disposed on the seat of the bathtub. A handle is located on the door at a position from which a bather disposed on the seat of the bathtub can grasp the handle to manually translate the door between the fully open and fully closed positions. A door controller is provided, having a mechanism for retaining the door in the fully open position until moved therefrom by the bather. A device is also provided for adjusting the height of the door in the fully open position, so that the door is high enough to permit the bather to readily enter the bathing unit through the access opening without any interference, yet low enough to permit the bather, when disposed on the seat of the bathtub, to reach the handle on the door to manipulate the same. In this manner, the bather may enter and exit the bathing unit, and open, close, and lock the door by himself from a seated position within the bathtub, without

1 requiring an assistant.

A spring loaded counterbalance may be connected with the door to resiliently retain the same in the fully open position. The counterbalance includes a device for
5 adjusting spring tension, and an adjustable stop may be provided to positively locate the door in the selected fully open position.

Another aspect of the present invention is a combination door guide and grab bar arrangement for
10 bathing units of the type having a bathtub with an access opening in one side, and a vertically translating door to selectively close the opening. The combination door guide and grab bar arrangement comprises a pair of upright support posts positioned adjacent opposite side edges of
15 the door, which are oriented in a mutually parallel and generally vertical relationship. Guides are mounted on the opposite side edges of the door, and are telescopingly received over the support posts for sliding translation therealong. The support posts both guide the door between
20 the open and closed positions, and provide vertical grab bars along the sides of the access opening to facilitate ingress and egress, without interfering with the operation of the door.

The support posts are preferably cylindrical,
25 with an inverted L-shape in side elevation, and the guides are pivotally mounted on the door, so that the door may assume an overhead storage position. The inverted L-shape posts may have a support bracket for additional rigidity, and the guides have a mating slot through which the rod
30 support brackets pass as the door is translated.

1 Yet another aspect of the present invention is an
adjustable control console for bathing units of the type
having a bathtub with at least one water dispenser, a seat
area at one end of the bathtub, and a controller located
5 at the other end of the bathtub to adjust the water
dispenser. The adjustable console comprises a cabinet
having a chassis, and a front plate facing the one end of
the bathtub. The controller is mounted in the chassis,
and includes a variable actuator portion which extends
10 through the front plate of the cabinet, and is accessible
to a user disposed in the seat area of the bathtub. A
console support is connected with the bathtub, and
slidingly mounts the cabinet at the other end of the
bathtub for selective movement along a generally
15 horizontal plane. A connector non-rigidly communicates
the controller with a source of pressurized water, whereby
the console is bodily translated along the support to
adjust the fore-to-aft position of the console with
respect to the seat area of the bathtub for a particular
20 user, such that variously sized users can readily grasp
and manipulate the actuator portion of the controller.

 The adjustable control console preferably
includes a handle which can be grasped by a seated user,
so that the user may himself adjust the position of the
25 console, without requiring an assistant. Furthermore, the
console support preferably comprises a combination support
and grab bar arrangement that facilitates entering and
exiting the bathtub.

 Yet another aspect of the present invention is a
30 power door lock for bathing units of the type having a
bathtub with an access opening, and a vertically

1 translating door. The access opening has a wedge-shaped
 contour which mates with a similarly shaped sealing edge
 of the door. A compression seal is positioned between the
 lip portion of the bathtub and the sealing edge of the
 5 door to form a watertight seal therebetween. The power
 door lock comprises a lock pin connected with the door,
 which protrudes outwardly from the lower edge thereof. A
 latch arm is connected with the bathtub, and is shaped to
 matingly engage the lock pin when the door is in an
 10 initial, closed position. A power actuator mechanically
 moves the latch arm laterally into engagement with the
 lock pin, and thence moves the latch arm longitudinally,
 and pulls the lock pin and the door downwardly until the
 compression seal is seated securely between the lip of the
 15 bathtub and the sealing edge of the door to form a
 watertight seal therebetween.

Preferably, the power actuator comprises a
 hydraulic ram which operates from the water pressure
 available in the bathing unit. The door may have a spring
 20 loaded counterbalance which normally retains the door in a
 fully open position, and a snap lock to selectively retain
 the door in an initial, closed position in which the lock
 pin is aligned with the mating latch arm to insure proper
 engagement. The length of the lock pin may be adjustable
 25 to vary pressure on the compression seal, and a cam slide
 linkage may be used to shift the latch arm laterally and
 longitudinally.

The principal objects of the present invention
 are to provide a bathing unit that has total bathing and
 30 whirlpool for standard hygiene as well as hydrotherapy,
 and can be operated solely by the bather from within the

1 bathtub, without the need for an assistant. The height of
the door in the fully open position can be easily adjusted
for a particular bather, so that the door is high enough
that the bather can readily enter and exit the tub without
5 bumping his head, yet is low enough that when the bather,
when seated within the bathtub, can readily reach the door
and manually raise and lower the same. A combination door
guide and vertical grab bar arrangement makes it possible
for even elderly or infirm bathers to easily raise and
10 lower the door by themselves, and to safely enter and exit
the bathing unit. An adjustable control console is
slidingly supported on horizontal rods, so that the seated
user can pull the entire console toward him for
convenience during use, and then push the console back to
15 a retracted, storage position to facilitate the user's
unobstructed entry and exit from the bathing unit.
Preferably, all of the controls for the bathtub, including
mixer temperature control, drain control, flow control,
whirlpool and areator controls, as well as the door lock
20 controller are mounted on the adjustable console. A
powered door lock is provided to securely lock the door in
the closed and sealed position, without requiring any
substantial manual effort on the part of the user. The
bathing unit is efficient in use, capable of a long
25 operating life, and particularly well adapted for home use.

These and other features, advantages, and objects
of the present invention will be further understood and
appreciated by those skilled in the art by reference to
the following specification, claims, and appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

1

Fig. 1 is a front elevational view of a bathing unit embodying the present invention, with the door shown in an open position.

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Fig. 2 is a perspective view of an adjustable control console portion of the bathing unit.

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Fig. 3 is a fragmentary, front elevational view of the bathing unit, particularly showing a combination door guide and grab bar arrangement, with the door shown in a closed position.

Fig. 4 is a fragmentary, side elevational view of the bathing unit shown in Fig. 3, wherein the door is also shown in the closed position.

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Fig. 5 is a top plan view of an upper door guide portion of the bathing unit.

Fig. 6 is a top plan view of a lower door guide portion of the bathing unit.

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Fig. 7 is a fragmentary, rear elevational view of the bathing unit, particularly showing a counterbalance spring arrangement for the door.

Fig. 8 is a fragmentary, partially schematic, top plan view of the bathing unit, with the door shown in the open position.

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Fig. 9 is a fragmentary, partially schematic, side elevational view of that portion of the bathing unit illustrated in Fig. 8, with the door shown in the same, open position.

30

Fig. 10 is a fragmentary, top plan view of the bathing unit, particularly showing the adjustable control console, which is illustrated in an outwardly extended position.

1 Fig. 11 is a fragmentary, top plan view of the
bathing unit shown in Fig. 10, with the adjustable control
console shown in a retracted, storage position.

5 Fig. 12 is a fragmentary, vertical
cross-sectional view of the bathing unit, particularly
showing a power door lock, wherein the door is shown in a
partially open position.

10 Fig. 13 is a fragmentary, vertical
cross-sectional view of the bathing unit and power door
lock, wherein the door is shown in an initial, closed
position.

15 Fig. 14 is a vertical cross-sectional view of the
bathing unit and the power door lock, wherein the door is
shown in the initial closed position, and a latch arm
portion of the lock is engaged with the door.

Fig. 15 is a vertical cross-sectional view of the
bathing unit and the power door lock, wherein the door is
shown in a fully closed and sealed position.

20 Fig. 16 is a front elevational view of the
bathing unit, wherein a bather is shown seated in a
bathtub portion of the bathing unit.

Fig. 17 is a front elevational view of the
bathing unit, wherein a bather is shown seated in the
bathtub, and grasping the door to lower the same.

25 Fig. 18 is a front elevational view of the
bathing unit, wherein the bather is shown seated within
the bathtub, with the door fully closed.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

30 For purposes of description herein, the
terms "upper," "lower," "right," "left," "rear," "front,"
"vertical," "horizontal," and derivatives thereof shall

1 relate to the invention as oriented in Fig. 1, and in
relation to a seated bather. However, it is to be
understood that the invention may assume various
alternative orientations, except where expressly specified
5 to the contrary.

The reference numeral 1 (Fig. 1) generally
designates a bathing unit, which is particularly designed
for home use, and embodies the present invention. Bathing
unit 1 includes a bathtub 2 with an access opening 3 in
10 one side for ingress and egress, and a vertically sliding
door 4 to selectively close access opening 3. Bathing
unit 1 has a unique, combination door guide and grab bar
arrangement 5, an adjustable control console 6, and a
power door lock 7, all of which permit the bather to
15 easily operate door 4 by himself and to adjust the water
temperature, flow and whirlpool from a seated position
within bathtub 2. The bather may thereby receive a total
bathing and whirlpool experience in private, without the
need for an assistant. The combination door guide and
20 grab bar arrangement 5 includes a pair of support rods 8
and 9 located on either side of the access opening 3,
which act both as a track on which door 4 smoothly and
easily glides, and also as vertical grab bars which
greatly facilitate safely entering and exiting the
25 bathtub, without interfering with the operation of door
4. Adjustable control console 6 allows the seated bather
to move the water controls to a convenient location within
easy reach for bathing, and then retract the console to an
out of the way storage position to facilitate entering and
30 exiting the bathtub. The power door lock 7 securely
closes door 4 to a fully closed and sealed position

1 without significant manual effort, and includes a remote
actuator 10 (Fig. 2) located on control console 6 to
facilitate use of bathing unit 1 without an attendant.

Bathing unit 1 (Fig. 1) generally comprises a
5 three-sided enclosure, including a rear wall 15, and left-
and right-hand end walls 16 and 17, respectively. Bathtub
2 is disposed within enclosure walls 15-17, and preferably
comprises a seat 18 having an anatomical contour. Seat 18
has a seat portion 19 disposed at an elevation
10 substantially commensurate with conventional chair height,
a back portion 20, and a footwell 21. Preferably,
enclosure walls 15-17 and seat 18 are integrally molded in
one piece from a durable, rigid, non-corroding material,
such as fiberglass or the like. Seat portion 19 is
15 inclined slightly to the rear, and includes a U-shaped
trough or channel 22 disposed in the medial portion of the
seat, and oriented longitudinally therein. Trough 22
extends from the middle of seat portion 19, and is
anatomically shaped and positioned to expose the perineal
20 area of a bather sitting on seat 18. The forward edge of
seat portion 19 is rounded, and the rearward edge is
arcuately shaped and blends smoothly with the back portion
20. Seat 18 includes lateral sidewalls 23 which extend
upwardly from seat portion 19, and include ledges 24 which
25 form armrests for the bather. Footwell 21 includes a
drain 25 (Fig. 10) with a conventional shutoff valve.

Bathtub 2 (Fig. 2) has a front wall 26 which is
oriented generally vertically, and includes a central
notch 27 in which adjustable control console 6 is received
30 in a retracted, storage position. The front wall 26 of
bathtub 2 tapers inwardly and downwardly to the base of

1 footwell 21. A ledge 28 is formed around the upper edge
or rim of bathtub 2, and a forward side panel 29 (Fig. 1)
extends from the floor upwardly to access opening 3.

5 In the illustrated bathing unit 1, access opening
3 is oriented laterally, and is defined by a lip 40 (Fig.
1), having an upwardly opening, wedge-shaped contour.
Door 4 includes a wedge-shaped sealing edge 41 (Fig. 12)
on the interior side thereof, which conforms to the
contour of lip 40. A compression seal 42 is positioned
10 between the lip 40 on bathtub 2, and the sealing edge 41
of door 4, such that when door 4 is fully closed, as shown
in Fig. 15, seal 42 is compressed to form a watertight
seal therebetween. Lip 40 and sealing edge 41 preferably
have a generally arcuate front elevational shape, as best
15 illustrated in Figs. 1 and 16-17. In the illustrated
example, lip 40 and sealing edge 41 have a nearly
semicircular, front-elevational shape to facilitate
substantially uniform compression of seal 42 about the
sealing edge of door 4.

20 Door 4 (Figs. 3 and 4) has a generally
rectangular shape, and includes a front panel 48, an
interior panel 49, opposite side edges 50, and upper and
lower edges 51 and 52, respectively. The right-hand
portion of bathtub 2 is integrally molded on the interior
25 panel 49 of door 4, so that when door 4 is open, the
right-hand side of seat 18 is fully open and exposed to
facilitate entering and exiting bathtub 2. The front
panel 48 of door 4 has an opening therein to access the
interior of door 4 to adjust power door lock 7, and for
30 other purposes to be described hereinafter. A removable
cover 53 is detachably mounted over the access opening in

1 door 4 by suitable means, such as threaded fasteners, or
the like. In this example, removable cover panel 53 (Fig.
1) includes a recess 54 with a towel rack 55 mounted
therein. An elongated, cylindrical grab handle 56 is
5 attached to the lower edge 52 of door 4, and protrudes
outwardly therefrom to facilitate grasping the door and
manually manipulating the same between the open and closed
positions.

The combination door guide and grab bar
10 arrangement 5 is best illustrated in Figs. 1-9. Support
posts 8 and 9 are mounted in bathing unit 1 adjacent the
opposite side edges 50 of door 4, and extend in a mutually
parallel, and generally vertical orientation. In the
illustrated example, support posts 8 and 9 (Figs. 8 and 9)
15 are cylindrical, and have an inverted L-shape in side
elevation, comprising a straight vertical leg 60, a
straight horizontal leg 61, and a curved intermediate
portion 62. The lower ends of support rods 8 and 9 are
fixedly mounted in the base of bathing unit 1. The upper
20 ends of support rods 8 and 9 are fixedly mounted in the
rearwall 15 of bathing unit 1. As shown in Fig. 8,
support braces 63 are attached to support rods 8 and 9
near the forward ends of horizontal legs 61. Braces 63
are generally T-shaped and include a flat, laterally
25 extending plate 64, and a base plate 65 which is fastened
to the enclosure end walls 16 and 17 by fasteners 66.
Braces 63 provide support posts 8 and 9 with lateral
rigidity so that the support rods will remain accurately
aligned, and door 40 will glide smoothly between the open
30 and closed positions. Support rods 8 and 9 preferably
have a smooth exterior surface, and are constructed of a

1 very durable, water resistant material, such as chrome
plated tubing, or the like.

 As best illustrated in Fig. 16, the vertical legs
60 of support rods 8 and 9 are completely open or
5 freestanding, so that they function as vertical handles or
grab bars. The vertical rod legs 60 are spaced outwardly
from enclosure end walls 16 and 17, as well as front panel
29, so that the bather's hand can easily grasp the rods at
any location along their length. Braces 63 insure that
10 the vertical rod legs 60 are sufficiently rigid to
function as grab bars, and are located at the top of the
unit, so that they do not interfere with the bather's grip
on the rods. When door 4 is open, the vertical rod legs
60 are located immediately adjacent to the sides of access
15 opening 3, so that they are handy to grasp as the bather
enters and exits bathing unit 1. Heretofore, it has not
been possible to position grab bars at a convenient
location near the access opening 3, because they obstruct
or interfere with the operation of door 4. In the present
20 invention, the vertical rod legs 60 not only do not
interfere with the operation of door 4, but they actually
function as an integral part of the door guide mechanism.

 Two pairs of guides 70 and 71 (Figs. 3 and 4) are
mounted on the opposite side edges 50 of door 4, and are
25 telescopingly received over support rods 8 and 9 for
sliding translation therealong. Preferably, at least the
upper pair of guides 70 are pivotal with respect to door
4, so that the door may assume an overhead storage
position, as illustrated in Fig. 1. In the illustrated
30 bathing unit 1, both pairs of guides 70 and 71 are
pivotaly mounted in door 4, to assure smooth operation,

1 and so that door 4 can assume a fully overhead storage
position if the same is desired.

5 With reference to Fig. 6, the lower guides 71
comprise a hollow, cylindrical housing 72 with a mounting
pin 73 fixedly attached to housing 72, and extending
radially outwardly therefrom. An annularly shaped,
antifriction insert 74 is mounted within housing 72, and
is sized to be closely received over an associated one of
the support rods 8 and 9. Insert 74 may be constructed of
10 a suitable self-lubricating material, such as nylon, or
the like.

The upper guides 70 (Fig. 5) are substantially
similar in construction to the lower guides 71, and
include a hollow, cylindrical housing 77, a mounting pin
15 78 connected with housing 77, and an antifriction insert
79. The upper guides 70 include a slot 80 through the
housing 77 and insert 79 at a location diametrically
opposed from pin 78. Slot 80 is slightly larger in width
than the thickness of the brace plate 64 on the support
20 rod braces 63, so that the upper guides 70 can pass over
the support rod braces 63 when the door is raised to an
overhead storage position.

As best illustrated in Fig. 3, a pair of
self-lubricating bushings 84 are mounted in the side edges
25 50 of door 4 adjacent the upper edge 51 of the door.
Bushings 84 include a central aperture in which in the
mounting pins 73 of the upper guides 70 are closely
received to rotatably mount the guides 70 with respect to
door 4. A second pair of antifriction bushings 85 are
30 mounted in the side edges of door 4 adjacent the lower
edge 52 thereof. Bushings 85 also include central

1 apertures in which the pins 78 of the lower guides 71 are
received to rotatably mount guides 71 therein. Coil
springs 86 are positioned over the mounting pins 73 and 78
of the upper and lower guides 70 and 71 between the
5 associated housing and bushings 77 & 84 and 72 & 85,
respectively, and urge the sides of door 4 inwardly, so
that door 4 "floats" laterally on guides 70 and 71. This
floating action provides smooth, non-binding translation
of the door, and also self-aligns the sealing edge 41 of
10 door 4 with the mating lip 40 of bathtub 2.

 With reference to Fig. 7, a spring loaded
counterbalance mechanism 88 is provided to resiliently
retain door 4 in a normally open position. Counterbalance
88 is mounted within the interior of bathtub 2, and
15 includes an elongate axle 89 rotatably mounted along the
rearward edge of bathtub 2. A pair of take-up drums 90
are attached to the opposite ends of axle 89, and a coil
spring 91 is positioned over a medial portion of axle 89.
One end of spring 91 is held stationary by a bracket 92,
20 and the opposite end of spring 91 is connected to axle 98
by an adjustable collar 93. Rotation of collar 93 with
respect to axle 89 varies the rotational torque applied to
the pick-up drums 90 by spring 91.

 Flexible lines 96 are connected to and wrapped
25 around both take-up drums 90. Flexible lines 96 extend
from take-up drums 90, through the interior of bathing
unit 1, to pulleys 97 (Fig. 1) mounted in the upper,
forward portions of enclosure walls 16 and 17. Brackets
98 (Figs. 8 and 9) are attached to the rear panel 49 of
30 door 4, adjacent the lower guides 71. Brackets 98 extend
laterally outwardly from the side edges 50 of door 4, and

1 swivel eyelets 99 rotatably attach the ends of flexible
lines 96 to brackets 98. As door 4 is moved downwardly
toward the closed position, the pulling force is
transmitted to flexible lines 96, which in turn rotates
5 take-up drum 90, and tenses spring 91. When door 4 is
released, the rotational torque stored in spring 91 tenses
flexible lines 98, and pulls door 4 upwardly to the
normally open position illustrated in Figs. 1, 8 and 9.

The fully open position of door 4 is preferably
10 adjustable to accommodate the particular individual or
individuals using bathing unit 1. In the fully open
position, door 4 should be sufficiently high to permit the
user to readily enter bathing unit 1 through access
opening 3, without bumping his head, as shown in Fig. 16.
15 Yet, door 4 should be low enough in the fully open
position to permit the user seated on seat 18 to readily
reach and grasp handle 56, as shown in Fig. 17, so as to
pull door 4 closed.

The fully open position of door 4 can be adjusted
20 by simply varying the tension applied to door 4 by
counterbalance 88. This adjustment can be achieved by
either rotating adjustable collar 93, or by varying the
effective length of flexible lines 96 by repositioning the
same on take-up drums 90.

25 A positive stop 102 (Figs. 8 and 9) may be
provided to positively maintain door 4 in a preselected,
fully open position. In general, stop 102 comprises a
device, such as a clamp, split sleeve, or the like, which
is positioned to cause abutment between door 4 and a
30 stationary portion of bathing unit 1 to prevent door 4
from opening further. The illustrated stop 102 comprises

1 a hollow cylindrical sleeve, which is closely received
over support 9. A set screw 102 is threadedly engaged in
the sidewall of stop 102, and abuts the exterior surface
of support rod 9 to detachably lock stop 102 in a
5 particular position. In the example illustrated in Figs.
8 and 9, stop 102 is positioned on the medial portion of
the horizontal leg 61 of support rods. Preferably, an
identical stop 102 is positioned on the horizontal leg of
the opposite support rod 8. Counterbalance 88 is adjusted
10 so as to apply light tension to flexible lines 96 when
door 4 is in the positively stopped, fully open position,
such that door 4 will automatically return to the desired
location through the force of spring 91.

The adjustable control console 6 is best
15 illustrated in Figs. 2, 10 and 11. Control console 6
comprises a cabinet 106 (Figs. 10 and 11) having a chassis
107, and a front plate 108. A plurality of controllers
109 are mounted in cabinet 106, and include actuator
levers 110, which extend through front plate 108, and are
20 accessible to a bather positioned on seat 18. In the
illustrated example, adjustable console 6 includes a
hot/cold water mixer valve 111, a tub-fill valve 113, a
shower valve 114, the door lock actuator 10, a bowden
cable controller 115 for drain valve 25, and a water
25 temperature indicator 112 (Fig. 2). Adjustable console 6
also includes a whirlpool controller 116, and an aerator
controller 117, which extend through front plate 108. A
tub fill spout 118 is connected with a lower, rear
portion of the console chassis 107, and is oriented
30 toward the left-hand sideall 22 of bathtub 2 to alleviate
splashing. Each of the individual water controllers

1 111-117, as well as tub fill spout 118, and door
controller 10 is non-fixedly connected with their
associated actuator by means such as flexible plumbing
lines, bowden cables, and the like, so that console 6 can
5 be translated fore-to-aft in bathtub 2, without
interfering with the controls. For example, tub-fill
valve 113, and shower valve 114 are in the nature of ball
valves, and together with mixer valve 111 are communicated
with sources of pressurized hot and cold water through
10 flexible plumbing line 119 (Fig. 10). A bowden cable 120
connects controller 115 with the drain valve 25. As
described in greater detail hereinafter, door lock valve
10 is in the nature of a ball valve, and controls the
communication of water pressure to a door lock actuator
15 through a flexible plumbing line 121. All of the actuator
lines, including lines 116, 117 and 118 extend from the
rear of cabinet 106, through an aperture 122 in the front
wall 26 of bathtub 2. An arcuately shaped tube or hood
123 encircles aperture 122, to insure that lines 119, 120
20 and 121 do not bind as console 6 is moved during
adjustment.

Controllers 113, 114, 115 and 10 are all lever
operated, and are shifted between the open and closed
positions by a vertical motion. This type of control
25 action permits the controller to be adjusted by bathers
that have limited dexterity in their fingers, such as
patients with arthritis, and the like, since it is not
necessary to grasp the controller in order to adjust it.

A pair of hollow guides 124 and 125 are mounted
30 on the opposite sides of cabinet 106, and are adapted to
slidingly support console 6 for translation along a

1 substantially horizontal plane. Guides 124 and 125
preferably include antifriction bushings, such as nylon
sleeves, or the like (not shown) to help console 6 slide
smoothly. A handle 126 (Fig. 2) is attached to the lower,
5 forward portion of cabinet 106, and is adapted to be
grasped by a bather seated on seat 18 to facilitate
adjustment of console 6, without requiring an assistant.

The support device for console 6 preferably
comprises a combination support and grab bar arrangement
10 130 (Figs. 10 and 11), having left- and right-hand support
posts 131 and 132, respectively. The right-hand support
post 131 is mounted in the front wall 26 of bathtub 2 at
the right-hand side thereof, adjacent lip 40. The
right-hand support post 131 comprises a straight,
15 horizontally oriented upper leg 133, with the free end
securely mounted in front wall 26. The right-hand guide
125 on console cabinet 106 is closely received over the
upper leg 133 of support post 131 for sliding translation
therealong. Support post 131 also includes an inclined
20 lower leg 134 (Figs. 1 and 2), which has its free end
securely mounted in front wall 26 at a location near lip
40, and below upper leg 133. The right-hand support post
131 includes an arcuately shaped intermediate portion 135,
which interconnects the upper and lower legs 133 and 134,
25 and forms a grab handle which protrudes outwardly toward
the seat 18 of bathtub 2.

The left-hand support post 132 (Figs. 10 and 11)
also includes a straight, horizontally oriented upper leg
138, having a free end mounted securely in front wall 26,
30 at a location adjacent the rear wall 15. The left-hand
guide 124 of cabinet 106 is telescopingly received over

1 the upper leg 138 of support post 132, and slidably
supports console 6 for translation therealong. The
left-hand support post 132 also includes a straight,
downwardly inclined lower leg 139, with one end mounted in
5 the left-hand sidewall 23 of bathtub 2, adjacent the
left-hand armrest ledge 24. An arcuately shaped
intermediate section 140 of support post 132 interconnects
the upper and lower legs 138 and 139 respectively. A
lateral support rod 141 has one end connected with the
10 outer end of upper leg 138, and the other end fixedly
mounted in the rear wall 15 of bathing unit 1. The lower
leg 139 of left-hand support post 132 forms an elongate
handle which a bather seated on seat 18 may easily grasp
with his left hand.

15 Adjustable control console 6 glides horizontally
on support posts 131 and 132 to adjust its fore-to-aft
position within bathtub 2, particularly with respect to
seat 18. The cabinet 106 of console 6 is shaped to be
received in a mating notch 27 in the front wall 26 of
20 bathtub 2 when the console is in a retracted, storage
position, as shown in Fig. 11. This permits the bather to
enter and exit bathtub 2 without any obstructions. The
seated bather may pull adjustable control console 6
outwardly from the retracted, storage position to a
25 convenient operating position, as shown in Fig. 10.

A "telephone" type shower head or wand 144 (Fig.
1) is mounted on the rear wall 15 of bathing unit 1 by a
vertical bracket 145. A flexible tube 146 connects shower
head 144 with a source of pressurized water through
30 controller valve 114 on adjustable console 6.

1 As best illustrated in Figs. 12-15, door lock 7
comprises a lock pin 150, which is connected with door 4,
and projects outwardly from the lower edge 52 thereof. A
latch arm 151 is connected with bathtub 2 at a lower,
5 forward portion thereof, and is shaped to matingly engage
with lock pin 150 when door 4 is in an initial closed
position, as shown in Fig. 13. A cam slide linkage 152,
powered by a hydraulic cylinder or jack 153 moves latch
arm 151 laterally out into engagement with lock pin 150,
10 and pulls lock pin 150 and door 4 downwardly until
compression seal 42 is securely seated between the lip 40
of bathtub 2 and the sealing edge 41 of door 4, as shown
in Fig. 15.

 The only portion of power door lock 7 contained
15 within door 4 is lock pin 150, and its associated mounting
arrangement. Hence, the door 4 itself does not carry any
linkage or mechanical lock, as contemplated by the in-door
lock arrangements for institutional bathing units, as
disclosed in our prior U.S. Patent Nos. 4,346,485;
20 4,446,586 and 4,399,569. Furthermore, door 4 does not
contain any plumbing for spray nozzles, or the like, as
disclosed in our prior U.S. Patent No. 4,439,877. The
overall weight of door 4 is thereby reduced to a minimum,
so that the effort required to raise and lower door 4 is
25 reduced accordingly to adapt the bathing unit 1 for
unassisted, home use.

 Lock pin 150 comprises a cylindrically-shaped
rod, having a elongate, annular slot or groove 156
adjacent the free end of lock pin 150, so as to define
30 shank and head portions 157 and 158 respectively of lock
pin 150. An arcuately shaped annular groove 159 is

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1 provided in lock pin 150 at a location spaced upwardly
from slot 156, to form one-half of a snap-lock, which is
described in greater detail hereinafter.

5 The upper end 160 of lock pin 150 is threaded,
and is mounted within the interior of door 4, through
sealing edge 41, near the vertical center line of door 4.
Lock pin 150 is preferably mounted in door 4 so that its
effective length can be adjusted to vary the sealing
pressure applied to compression seal 42. In the
10 illustrated example, a rectangularly-shaped bracket 161 is
positioned within the interior of door 4, and is fixedly
connected with the adjacent surfaces thereof. Bracket 161
includes vertically aligned apertures through its upper
and lower plates 162 and 163 respectively, and a pair of
15 threaded nuts 164 are positioned on that portion of the
threaded lock pin end 160 disposed between bracket plates
162 and 163. Nuts 164 are tightened outwardly against the
upper and lower plates 162 and 163 of bracket 160 to
securely, yet adjustably anchor lock pin 150 in door 4.

20 A semicircular, vertically oriented sleeve or
column 166 is formed in the front wall 29 of bathtub 2, in
vertical alignment with lock pin 150. Column 166 includes
a cylindrical aperture 167 extending through its center,
which is shaped to closely receive lock pin 150 therein.
25 A pair of spring loaded, ball retainers 168 are mounted in
an upper portion of column 166, and are adapted to engage
the mating groove 159 in lock pin 150 so as to hold door 4
in the initial closed position shown in Fig 13, against
the tension of the spring counterbalance 88, so that latch
30 arm 151 will be in proper lateral alignment with lock pin
150 to fully close and lock door 4.

1 Latch arm 151 has a plate-shaped body 172, with a
fork or claw 173 located at the upper end thereof, which
extends through a mating slot 174 into the center aperture
167 of column 166. Claw 173 includes a pair of prongs,
5 which are laterally spaced apart, and are shaped to be
received over the shank 157 of lock pin 150, and to engage
the lock pin head 158. The latch arm body 172 is
slidingly received and retained between a pair of parallel
10 bracket plates 175 that are fixedly connected with bathtub
2. Bracket plates 175 include a pair of transversely
aligned slots 176, having a laterally extending,
downwardly inclined upper leg 177, and a vertically
extending lower leg 178 communicating therewith. A
laterally extending pin 179 is mounted in the body portion
15 172 of latch arm 151, and the opposite ends of pin 179
extend through the aligned slots 176 to form a cam and a
cam follower that shifts latch arm 151 laterally outwardly
and downwardly in a predetermined pattern and sequence. A
link 180 is pivotally mounted between bracket plates 175
20 at a medial portion of the link by a pin 181. One end of
link 180 is pivotally connected with the lower end of
latch arm body 172 by a pin 182. Hydraulic jack 153 has a
stationary base attached fixedly to the frame of bathing
unit 1, and an upper, reciprocating rod end 183 pivotally
25 attached to the opposite end of link 180 by a pin 184. A
return spring 185 has one end connected with the outwardly
protruding end of link 180, and the other end is connected
with a stationary surface, such as the frame of bathing
unit 1. Preferably, hydraulic jack 153 is actuated by
30 pressurized water which is available in the bathing unit,
and in the illustrated example, hydraulic jack 153

1 communicates with actuator valve 10 through flexible
plumbing line 121.

In operation, door lock 1 functions in the
following manner. Door 4 is lowered until spring loaded
5 latch balls 168 are engaged in the mating groove 159 of
lock pin 150, as illustrated in Fig. 13. The snap-lock
formed by latch balls 168 retains door 4 in place against
the force of the spring loaded counterbalance 88 in a
predetermined position, in which the claw 173 of latch
10 arm 151 is aligned with the shank portion 157 of lock pin
150. To lock door 4, the user simply shifts door valve
actuator 10 to the open position, thereby communicating
pressurized water with hydraulic jack 153. The
reciprocating end 183 of the jack is thereby forced
15 upwardly, and link 179 is rotated in a clockwise
direction, as viewed in Figs 12-15. The rotating motion
of link 180 exerts a downward force on the lower end of
latch arm 151, causing the upper end of latch arm 151 to
move laterally outwardly and downwardly as cam pin 179
20 follows the upper legs 177 of cam slots 176. The claw
portion 173 of latch arm 151 is thereby moved laterally
outwardly over the shank 157 of lock pin 150, and into
engagement with the lock pin head 158, as illustrated in
Fig. 14. Continued rotation of link 180 pulls cam pin 179
25 downwardly along the lower legs 178 of cam slots 176. The
latch arm claw 173 thereby pulls lock pin 150 downwardly,
thereby compressing seal 42 securely between the lip 40 of
bathtub 2, and the sealing edge 42 of door 4, as
illustrated in Fig. 15. As long as the door lock
30 controller valve 10 remains open, the closing force
exerted on door 4 by hydraulic jack 153 will continue,

1 thereby securely locking door 4 in place. Hydraulic jack
153 preferably includes a check valve or back flow
preventor, which will insure that the pressure in
hydraulic jack 153 is maintained, even if there is a
5 temporary interruption of water pressure. Furthermore,
when door 4 is fully closed, and bathtub 2 is filled with
water, the hydraulic pressure from the water in the tub
which acts laterally on door 4 causes lock pin 150 to
engage the outer surface of mating column 166 to resist
10 these forces. The frictional forces that thereby develop
between lock pin 150 and column 166 will retain door 4 in
the fully closed and sealed position, even if door lock 7
is inadvertently released.

 After bathtub 2 has been drained, to release door
15 lock 7, the bather simply closes valve controller 10,
thereby removing the water pressure acting on hydraulic
jack 153. Return spring 185, in conjunction with the
resiliency of compression seal 42, rotates link 180 in a
counterclockwise direction, as viewed in Figs. 12-15,
20 thereby raising latch arm 151 and moving claw 173
laterally outwardly from engagement with the lock pin head
158. Door 4 is then lifted upwardly manually, with the
assistance of counterbalance 88, to the fully open
position.

25 In operation, bathing unit 1 is designed to be
used as follows. With door 4 in the fully open position
(Fig. 1), the bather positions himself facing the front of
bathtub 2, adjacent seat 18. The bather then grasps the
left-hand support rod 8 in his right hand, and turns
30 around 180 degrees, with his back oriented toward bathtub
seat 18. The bather then grasps the right-hand support

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1 post 131 for console 6 with his left hand, and lowers his
buttocks onto the seat portion 19 of seat 18, as
illustrated in Fig. 16. The bather then rotates his legs
inwardly into footwell 21. With his right hand, the
5 bather then grasps handle 56 on door 4, and pulls door 4
downwardly until snap-lock 168 is engaged. The bather
then grasps handle 126 on adjustable control console 6,
and pulls the same forwardly to a convenient location at
which he can easily manipulate the various controls. The
10 bather then manipulates door lock actuator 10, which fully
closes and seals door 4, as shown in Fig. 18. The bather
then adjusts the temperature of the water, and actuates
the tub-fill and/or the shower head, as the bather so
desires. For immersal bathing, drain valve 25 is closed
15 by manipulating controller 115. When bathtub 2 is at
least partially filled, the bather may then actuate the
whirlpool, and adjust the level of aeration accordingly.

When the bather is finished, the water and
whirlpool controllers 113-114 and 116-117 are shut off,
20 and the drain valve controller 115 is shifted to the open
position. As soon as the water has drained from bathtub
2, door lock 7 is deactivated by manipulating controller
10, control console 6 is pushed forwardly to the
retracted, out of the way storage position, and the bather
25 pulls upwardly on door 4. As soon as the snap-lock 168
has been released, door 4 will automatically raise to the
fully open position under the spring tension of
counterbalance 88. The bather may then exit bathtub 2 by
using the combination support posts and grab bars 8 and
30 131.

1 Bathing unit 1 is particularly designed for home
use, since door 4 and water controls 109 can be easily
operated by the user himself from within the bathtub 2.
The combination door guide and grab bar arrangement 5 not
5 only provides for a smooth, easily operating door, which
can be manually manipulated by even those of limited
physical strength or dexterity, but it also assists in
safely entering and exiting the bathtub. The adjustable
control console 6 gives the bather easy access to all of
10 the controls 109 for the various bathing functions when he
is seated in bathtub 2. Yet, adjustable control console 6
can be moved out of the way into a retracted storage
position to provide unhindered ingress and egress to
bathtub 2. The power door lock 7 securely closes door 4
15 in a manner that forms a watertight seal, and does not
require any significant degree of physical strength or
dexterity to operate. The actuator for power door lock 7
is also positioned on adjustable control console 6, so
that all of the bathtub functions can be readily
20 controlled by the bather himself from within bathtub 2.

 In the foregoing description, it will be readily
appreciated by those skilled in the art that modifications
may be made to the invention, without departing from the
concepts disclosed herein. Such modifications are to be
25 considered as included in the following claims, unless
these claims by their language expressly state otherwise.

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HOME BATHING UNIT

ABSTRACT OF THE DISCLOSURE

5 A bathing unit is particularly designed for home use, and includes a bathtub with an access opening in one side for easy ingress and egress, and a vertically sliding door to close the access opening. The bathing unit has a unique, combination door guide and grab bar arrangement, an adjustable control console, and a power door lock, all of which permit the bather to readily operate the door by himself, and to adjust the water temperature, flow and whirlpool from a seated position within the bathtub. The bather can receive total bathing and whirlpool therapy in private, without the need for an assistant. The combination door guide and grab bar arrangement includes a pair of support rods located on either side of the access opening, which function both as a track on which the door smoothly and easily glides, and also as vertical grab bars, which greatly facilitate entering and exiting the bathtub, and do not interfere with the operation of the door. The adjustable control console allows a seated bather to move the bathing controls to a convenient location within easy reach. The power door lock securely closes the door to a fully closed and sealed position without significant manual effort, and includes a remote actuator located on the control console to further facilitate the use of the bathing unit without an attendant, or other assistance.

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The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

-1-

- 1 A home bathing unit, comprising:
- a bathtub having opposite sidewalls and end walls, with an access opening in one of said sidewalls for bather ingress and egress therethrough;
- 5 a seat located in said bathtub adjacent to one of said end walls;
- a door shaped to selectively close said access opening;
- means for vertically guiding said door between a fully open position wherein bather movement through said access opening is permitted, and a fully closed position wherein said door sealingly closes said access opening;
- 10 means for securely locking said door in the fully closed position;
- 15 a lock actuator operably connected with said locking means, and positioned to be manipulated by a bather disposed on the seat in said bathtub;
- a handle located on said door at a position thereon from which a bather disposed on the seat in said bathtub can grasp said handle and manually translate said door between the fully open and fully closed positions;
- 20 a door controller, having means for retaining said door in said fully open position until moved therefrom by the bather, and means for adjusting the height of said door in the fully open position, so that said door is high enough to permit the bather to readily enter said bathing unit through said access opening, yet
- 25

low enough to permit the bather, when disposed on the seat
in said bathtub, to reach said handle and close said door,
30 whereby the bather may enter and exit the bathing unit,
and open, close and lock said door by himself from a
seated position within said bathtub, without requiring an
assistant.

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1 A home bathing unit as set forth in claim 1,
wherein:

said door controller further comprises a spring
loaded counterbalance operably connected with said door,
5 and resiliently retaining said door in the fully open
position.

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1 A home bathing unit as set forth in claim 2,
wherein:

said door height adjustment means comprises means
for adjusting spring tension in said counterbalance.

-4-

1 A home bathing unit as set forth in claim 3,
wherein:

said door height adjustment means further
comprises a stop connected with one of said door and said
5 bathtub, and shaped to abuttingly engage the other of said
door and said bathtub to positively locate said door in
the fully open position.

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1 A home bathing unit as set forth in claim 4,
wherein said door guiding means comprises:

a combination door guide and grab bar
arrangement, including a pair of upright support posts

5 positioned adjacent opposite side edges of said door, and
 guides mounted on the opposite side edges of said door and
 telescopingly received over said support posts for sliding
 translation therealong, whereby said support posts both
 guide said door between the fully open and fully closed
 10 positions, and also provide vertical grab bars along the
 sides of said access opening to facilitate bather ingress
 and egress therethrough without interfering with the
 operation of said door.

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1 A home bathing unit as set forth in claim 5,
 including:

an adjustable control console mounted on the end
 wall of said bathtub opposite said seat for sliding
 5 movement along a generally horizontal plane, and including
 a handle positioned to be grasped by a bather disposed on
 the seat in said bathtub, whereby the seated bather may
 himself vary the fore-to-aft position of said console with
 respect to said seat for ease of operation.

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1 A home bathing unit as set forth in claim 6,
 wherein:

said lock actuator is mounted on said adjustable
 control console.

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1 A home bathing unit as set forth in claim 7,
 including:

a bathtub fill spout attached to said adjustable
 control console, and translating therewith; and

5 means for nonrigidly communicating said bathtub
 fill spout with a source of pressurized water.

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1 A home bathing unit as set forth in claim 8,
wherein said door locking means comprises:

a lock pin connected with said door and
protruding outwardly from a lower edge of said door;

5 a latch arm connected with said bathtub, and
shaped to matingly engage said lock pin when said door is
in an initial closed position;

power means for mechanically moving said latch
arm laterally into engagement with said lock pin;

10 power means for mechanically moving said latch
arm longitudinally, and pulling said lock pin and said
door downwardly until said door is in the fully closed
position; and

means for retaining said door in the fully closed
15 position until released therefrom.

-10-

1 A home bathing unit as set forth in claim 9,
wherein:

said power means includes a hydraulic ram
actuated by water pressure.

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1 A home bathing unit as set forth in claim 10,
wherein:

said lock actuator comprises a valve which
controls water pressure to said hydraulic ram.

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1 A home bathing unit as set forth in claim 11,
wherein:

said access opening is defined by a lip having an
upwardly opening, wedge-shaped contour; and

5 said door has a wedge-shaped sealing edge which
conforms to the contour of said lip.

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1 A home bathing unit as set forth in claim 12,
including:

 a compression seal positioned between the lip on
said bathtub and the sealing edge of said door.

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1 A home bathing unit as set forth in claim 13,
including:

 means for adjusting the effective length of said
lock pin to vary compression force applied to said seal.

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1 A home bathing unit as set forth in claim 14,
wherein:

 said bathtub lip and said door sealing edge have
an arcuate, front-elevational shape.

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1 A home bathing unit as set forth in claim 15,
wherein:

 said bathtub lip and said door sealing edge have
a generally semicircular, front-elevational shape to
5 facilitate substantially uniform compression of said seal.

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1 A home bathing unit as set forth in claim 16,
wherein:

 said seat is integrally formed with said bathtub,
and comprises a seat portion disposed at an elevation
5 substantially commensurate with conventional chair height,
a back portion extending generally upwardly from said seat
portion, and a foot portion disposed below and forward of

said seat portion.

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1 A home bathing unit as set forth in claim 17,
wherein:

said seat, back and foot portions are integrally
formed, and have an anatomical shape for comfortably
5 supporting a seated bather.

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1 A home bathing unit as set forth in claim 18,
wherein:

said door support posts have a generally inverted
L-shape in side elevation; and
5 said guides are pivotal with respect to said
door, whereby said door may assume an overhead storage
position.

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1 A home bathing unit as set forth in claim 1,
wherein said door guiding means comprises:

a combination door guide and grab bar
arrangement, including a pair of upright support posts
5 positioned adjacent opposite side edges of said door, and
guides mounted on the opposite side edges of said door and
telescopingly received over said support posts for sliding
translation therealong, whereby said support posts both
guide said door between the fully open and fully closed
10 positions, and also provide vertical grab bars along the
sides of said access opening to facilitate bather ingress
and egress therethrough without interfering with the
operation of said door.

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1 A home bathing unit as set forth in claim 20,
wherein:

said door support posts have a generally inverted
L-shape in side elevation; and

5 said guides are pivotal with respect to said
door, whereby said door may assume an overhead storage
position.

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1 A home bathing unit as set forth in claim 1,
including:

an adjustable control console mounted on the end
wall of said bathtub opposite said seat for sliding
5 movement along a generally horizontal plane, and including
a handle positioned to be grasped by a bather disposed on
the seat in said bathtub, whereby a seated bather may
himself vary the fore-to-aft position of said console with
respect to said seat for ease of operation.

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1 A home bathing unit as set forth in claim 1,
wherein said door locking means comprises:

a lock pin connected with said door and
protruding outwardly from a lower edge of said door;

5 a latch arm connected with said bathtub, and
shaped to matingly engage said lock pin when said door is
in an initial closed position;

power means for mechanically moving said latch
arm laterally into engagement with said lock pin;

10 power means for mechanically moving said latch
arm longitudinally, and pulling said lock pin and said
door downwardly until said door is in the fully closed

position; and

means for retaining said door in the fully closed
 15 position until released therefrom.

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1 A home bathing unit as set forth in claim 1,
 wherein:

said access opening is defined by a lip having an
 upwardly opening, wedge-shaped contour;

5 said door has a wedge-shaped sealing edge which
 conforms to the contour of said lip;

a compression seal is positioned between the lip
 on said bathtub and the sealing edge of said door; and

said bathtub lip and said door sealing edge have
 10 a generally semicircular, front-elevational shape to
 facilitate substantially uniform compression of said seal.

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1 In a bathing apparatus of the type having a
 bathtub with an access opening in one side thereof, and a
 vertically translating door selectively closing said
 access opening, the improvement of a combination door
 5 guide and grab bar arrangement comprising:

a pair of upright support posts positioned
 adjacent opposite side edges of said door, and disposed in
 a mutually parallel and generally vertical orientation;

guides mounted on the opposite side edges of said
 10 door, and being telescopingly received over said support
 posts for sliding translation therealong, whereby said
 support posts both guide said door between open and closed
 positions, and also provide vertical grab bars along the
 sides of said access opening to facilitate user ingress

15 and egress, without interfering with the operation of said door.

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1 A bathing apparatus as set forth in claim 25,
wherein said guides comprise:

a first pair of sleeve-shaped guides, mounted in the side edges of said door adjacent an upper edge thereof;

5 a second pair of sleeve-shaped guides mounted in the side edges of said door adjacent a lower edge thereof, whereby both sides of said door are securely and evenly supported on said support posts for smooth, non-binding translation therealong.

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1 A bathing apparatus as set forth in claim 26,
wherein:

said door support posts have a generally inverted L-shape in side elevation; and

5 at least said first pair of guides are pivotal with respect to said door, whereby said door may assume an overhead storage position.

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1 A bathing apparatus as set forth in claim 27,
wherein:

said second pair of guides are pivotal with respect to said door, whereby said door may assume a fully overhead storage position.

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1 A bathing apparatus as set forth in claim 28,
wherein:

at least one of said support posts includes a support bracket extending outwardly therefrom to attach

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5 said support post to a stationary surface; and
 at least one of said first and second pairs of
 guides includes a longitudinally extending slot through
 which said rod support bracket passes as said door is
 translated between the open and closed positions.

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1 A bathing apparatus as set forth in claim 29,
 wherein:
 said support posts have a cylindrical shape; and
 said guides have a generally cylindrical shape,
 5 with antifriction inserts therein which glide over the
 exterior surfaces of said support posts.

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1 A bathing apparatus as set forth in claim 30,
 wherein:
 said guides each include a laterally extending
 mounting pin; and
 5 said door includes antifriction bushings mounted
 in the side edges thereof in which an associated mounting
 pin of said guides is closely received to rotatably mount
 said guides in said door.

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1 A bathing apparatus as set forth in claim 31,
 including:
 coil springs positioned over the mounting pins of
 said guides, and resiliently urging the side edges of said
 5 door inwardly, whereby said door floats laterally between
 said guides for non-binding translation over said support
 posts.

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1 A bathing apparatus as set forth in claim 32,
wherein:

said access opening is defined by a lip having an
upwardly opening, wedge-shaped contour;

5 said door has a wedge-shaped sealing edge which
conforms to the contour of said lip; and

a compression seal is disposed between the lip of
said bathtub and the sealing edge of said door, whereby
said bathtub lip and said door sealing edge self-align as
10 said door floats laterally between said guides.

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1 A bathing apparatus as set forth in claim 25,
wherein:

said support posts include at least one support
bracket extending outwardly therefrom to attach said
5 support posts to a stationary surface; and

at least one of said first and second pairs of
guides includes longitudinally extending slots through
which said rod support brackets pass as said door is
translated between the open and closed positions.

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1 In a bathing apparatus of the type having a
bathtub with at least one water dispenser, a seat area at
one end of said bathtub, and a controller for said water
dispenser at the other end of said bathtub, the
5 improvement of an adjustable console comprising:

a cabinet having a chassis, and a front plate
facing the one end of said bathtub;

means for connecting said controller to said
chassis, with a variable actuator portion of said

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10 controller extending through said front plate and
accessible to a user disposed at the seat area of said
bathtub;

a console support connected with said bathtub,
and having means for slidably mounting said cabinet
15 thereon at the other end of said bathtub for selective
movement along a generally horizontal plane; and

means for non-rigidly communicating said
controller with a source of pressurized water, whereby
said console is bodily translated along said support to
20 adjust the fore-to-aft position of said console with
respect to the seat area of said bathtub for a particular
user, such that variously sized users can readily grasp
and manipulate the actuator portion of said controller.

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1 A bathing apparatus as set forth in claim 35,
including:

a handle connected with said adjustable console,
and positioned to be grasped by a user disposed in the
5 seat area of said bathtub, whereby the user may himself
adjust the position of said console, without requiring an
assistant.

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1 A bathing apparatus as set forth in claim 36,
wherein said bathtub includes:

opposite sidewalls, and front and rear end walls,
with an access opening in one of said sidewalls for user
5 ingress and egress therethrough; and

a door selectively closing said access opening.

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1 A bathing apparatus as set forth in claim 37,
wherein:

 said console support comprises a combination
support and grab bar arrangement, including:

5 a first post having a straight, horizontally
 oriented upper leg with one end thereof mounted
 in the front end wall of said bathtub adjacent
 said access opening, and the other end formed
 into a handle;

10 a guide attached to said cabinet and
 telescopingly received over the upper leg of said
 first post for slidingly supporting said console
 for translation therealong.

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1 A bathing apparatus as set forth in claim 38,
wherein said combination support and grab bar arrangement
further comprises:

5 a second post having a straight, horizontally
 oriented upper leg with one end thereof mounted in the
 front end wall of said bathtub adjacent the other sidewall
 of said bathtub, and the other end formed into a handle;
 and

10 a guide attached to said cabinet and
 telescopingly received over the upper leg of said second
 post and slidingly supporting said console for translation
 therealong.

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1 A bathing apparatus as set forth in claim 39,
wherein:

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5 said first post has a straight downwardly
inclined lower leg with one end thereof mounted in the
front end wall of said bathtub adjacent said access
opening, and below the upper leg of said first post; and
said first post has an arcuate intermediate portion
interconnecting the other ends of the upper and lower legs
of said first post, and forming a grab handle.

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1 A bathing apparatus as set forth in claim 40,
wherein:

5 said second post has a straight, downwardly
inclined lower leg, with one end thereof mounted in the
other sidewall of said bathtub adjacent an armrest portion
thereof, and the other end connected with the other end of
the upper leg of said second post.

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1 A bathing apparatus as set forth in claim 41,
wherein:

 said first and second posts are positioned on
opposite sides of said cabinet for secure support.

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1 A bathing apparatus as set forth in claim 42,
including:

 a bathtub fill spout connected with said cabinet
and translating therewith; and

5 means for non-rigidly communicating said bathtub
fill spout with a source of pressurized water.

-44-

1 A bathing apparatus as set forth in claim 43,
wherein:

-42-

said water dispenser comprises a shower head with
a flexible supply hose.

-45-

1 A bathing apparatus as set forth in claim 44
including:

means for controlling water flow through said
bathtub fill spout, being mounted in said cabinet and
5 operable from the front plate thereof.

-46-

1 A bathing apparatus as set forth in claim 45,
including:

means for controlling water flow through said
shower head, being mounted in said cabinet, and operable
5 from the front plate thereof.

-47-

1 A bathing apparatus as set forth in claim 46,
including:

means for controlling the temperature of water
flowing through said bathtub fill spout and said shower
5 head, being mounted in said cabinet, and operable from the
front plate thereof.

-48-

1 A bathing apparatus as set forth in claim 47,
including:

a lock for selectively retaining said door in the
closed position; and

5 means for controlling said door lock, being
mounted in said cabinet, and operable from the front plate
thereof.

-43-

-49-

1 A bathing apparatus as set forth in claim 48,
including:

a drain mounted in a floor portion of said
bathtub, and including a shut-off valve; and

5 means for controlling said drain shut-off valve,
being mounted in said cabinet, and operable from the front
plate thereof.

-50-

1 A bathing apparatus as set forth in claim 49,
including:

means for swirling and aerating water in said
bathtub; and

5 means for controlling said water swirling and
aerating means, with an actuator portion thereof being
mounted in said cabinet, and operable from the front plate
thereof.

-51-

1 A bathing apparatus as set forth in claim 35,
including:

a bathtub fill spout connected with said cabinet
and translating therewith; and

5 means for non-rigidly communicating said bathtub
fill spout with a source of pressurized water.

-52-

1 A bathing apparatus as set forth in claim 35,
wherein:

said water dispenser comprises a shower head with
a flexible supply hose.

-44-

1 In a bathing apparatus of the type having a
bathtub with a seat area at one end thereof, an access
opening in one side of said bathtub, a vertically
translating door selectively closing the opening, and a
5 lock for retaining said door in a fully closed and sealed
position, the improvement of an adjustable console,
comprising:

 a cabinet having a chassis, and a front plate
facing the one end of said bathtub:

10 a motor for shifting said door lock between
locked and unlocked positions, and including a remote
controller therefor;

 means for connecting said lock controller with
said chassis, with an actuator portion of said lock
15 controller extending through said front plate, and
accessible to a user disposed in the seat area of said
bathtub;

 a console support connected with said bathtub,
and having means for slidably mounting said cabinet
20 thereon at the other end of said bathtub for selective
movement along a generally horizontal plane; and

 means for non-rigidly connecting said lock
controller with said motor, whereby said console is
bodily translated along said support to adjust the
25 fore-to-aft position of said console with respect to the
seat area of said bathtub for a particular user, such that
variously sized users can readily grasp and manipulate the
actuator portion of said lock controller.

-54-

1 A bathing apparatus as set forth in claim 53,
including:

a handle connected with said adjustable console,
and positioned to be grasped by a user disposed in the
5 seat area of said bathtub, whereby the user may himself
adjust the position of said console, without requiring an
assistant.

-55-

1 In a bathing apparatus of the type having a
bathtub with an access opening defined by a lip having an
upwardly opening, wedge-shaped contour, and a vertically
translating door with a wedge-shaped sealing edge which
5 conforms to the contour of said lip, and a compression
seal positioned between said lip and said sealing edge, an
improved locking arrangement for said door, comprising:

a lock pin connected with said door and
protruding outwardly from a lower edge of said door;
10 a latch arm connected with said bathtub, and
shaped to matingly engage said lock pin when said door is
in an initial closed position;

power means for mechanically moving said latch
arm laterally into engagement with said lock pin;

15 power means for mechanically moving said latch
arm longitudinally, and pulling said lock pin and said
door downwardly until said compression seal is seated
between the lip of said bathtub and the sealing edge of
said door to form a watertight seal therebetween, and
20 thereby define a fully closed door position; and

means for retaining said door in the fully closed
position until released therefrom.

-46-

1 A bathing apparatus as set forth in claim 55,
wherein:

said power means for moving said latch arm
laterally and longitudinally includes a hydraulic ram
5 actuated by water pressure.

1 A bathing apparatus as set forth in claim 56,
wherein:

said lock pin is cylindrically shaped, and
includes an elongate, annular slot adjacent the free end
5 thereof which defines shank and head portions of said lock
pin; and

said latch arm includes a fork with two prongs at
the free end thereof shaped for reception over said pin
shank and engagement with the head portion of said lock
10 pin.

1 A bathing apparatus as set forth in claim 57,
including:

a snap lock selectively retaining said door in
said initial closed position in which said fork is
5 laterally aligned with the mating slot in said lock pin
for engagement therewith.

1 A bathing apparatus as set forth in claim 58,
including:

means for adjusting the effective length of said
lock pin to vary pressure on said compression seal.

-60-

1 A bathing apparatus as set forth in claim 59,
wherein said power means for moving said latch arm
laterally and longitudinally further comprises:

5 a cam-slide linkage connected with a
reciprocating end of said hydraulic ram.

-61-

1 A bathing apparatus as set forth in claim 60,
wherein said cam-slide linkage comprises:

5 a bracket fixedly connected with said bathtub,
and including two, spaced-apart, parallel plates between
which a body portion of said latch arm is closely and
slidingly received;

10 a pair of aligned slots in said bracket plates,
having a laterally extending, downwardly inclined upper
leg, and a vertically extending lower leg communicating
therewith;

 a pin mounted in the body portion of said latch
arm, having opposite ends thereof extending through said
aligned slots; and

15 a link pivotally mounted between said bracket
plates at a medial portion of said link; a first end of
said link being pivotally connected with the reciprocating
end of said hydraulic jack, and a second end of said link
being pivotally connected with a lower end of said latch
arm, whereby extension of said hydraulic jack shifts said
20 latch arm along the path of said aligned slots, laterally
outwardly to engage said fork in the annular slot in said
lock pin, thence vertically downwardly to pull said door
into the fully closed position.

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-62-

1 A bathing apparatus as set forth in claim 61,
wherein said cam-slide linkage further comprises:

5 a return spring connected with the first end of
said link to automatically return said latch arm to a
raised, unlocked position.

-63-

1 A bathing apparatus as set forth in claim 62,
including:

5 a valve controlling the supply of pressurized
water to said hydraulic ram, and defining said door
retaining means.

-64-

1 A bathing apparatus as set forth in claim 55,
wherein:

5 said lock pin is cylindrically shaped, and
includes an elongate, annular slot adjacent the free end
thereof which defines shank and head portions of said lock
pin; and

10 said latch arm includes a fork with two prongs at
the free end thereof shaped for reception over said pin
shank and engagement with the head portion of said lock
pin.

-65-

1 A bathing apparatus as set forth in claim 55,
including:

5 a snap lock selectively retaining said door in
said initial closed position, in which said fork is
laterally aligned with the mating annular slot in said
lock pin for engagement therewith.

-49-

-66-

1 A bathing apparatus as set forth in claim 55,
including:

 means for adjusting the effective length of said
lock pin to vary pressure on said compression seal.

-67-

1 A bathing apparatus as set forth in claim 55,
wherein said power means for moving said latch arm
laterally and longitudinally comprises:

 a linear motor; and

5 a cam-slide linkage connected between said latch
arm and a reciprocating end of said linear motor.



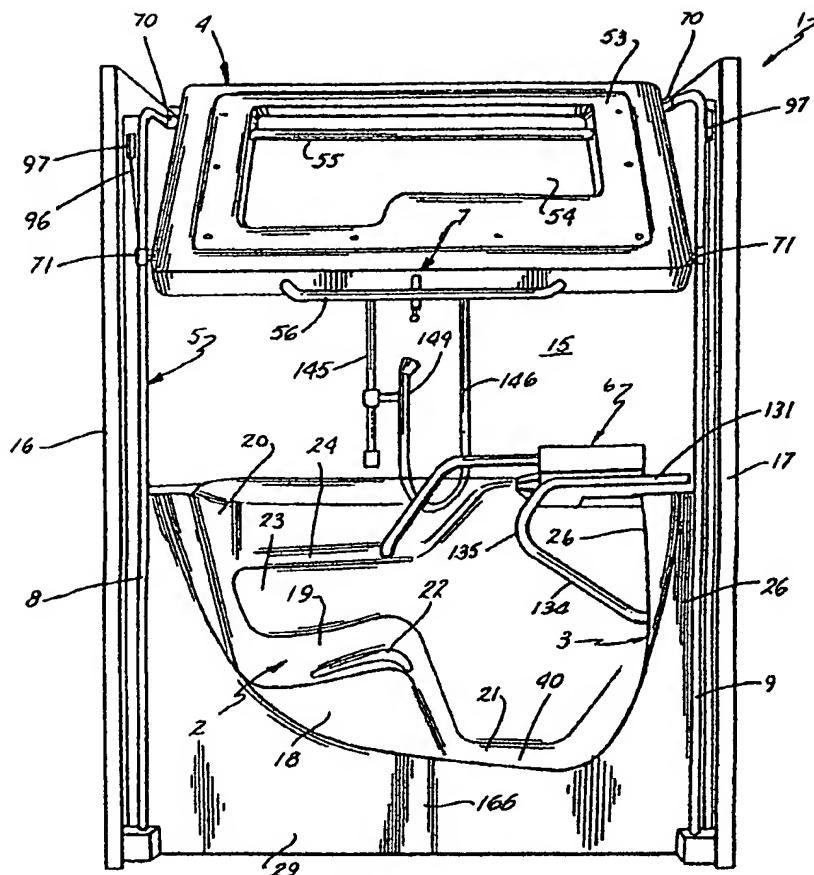


Fig. 1.

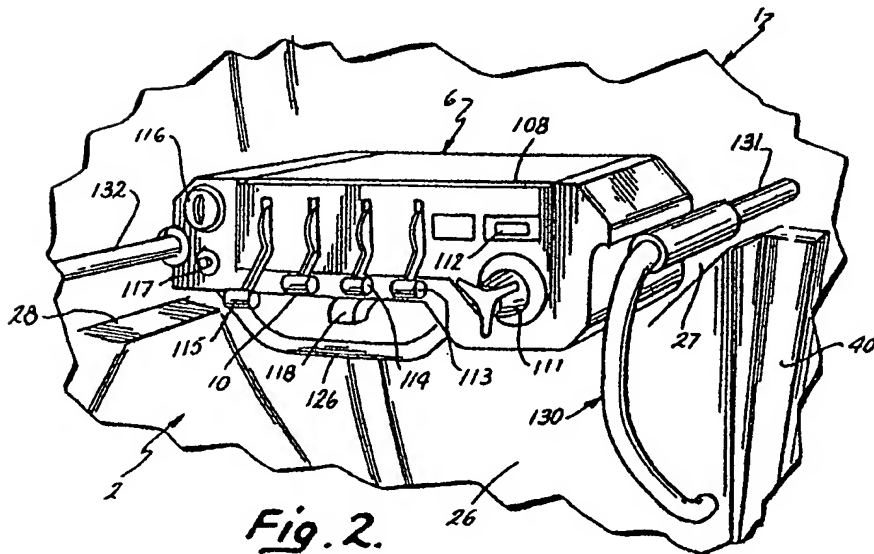


Fig. 2.

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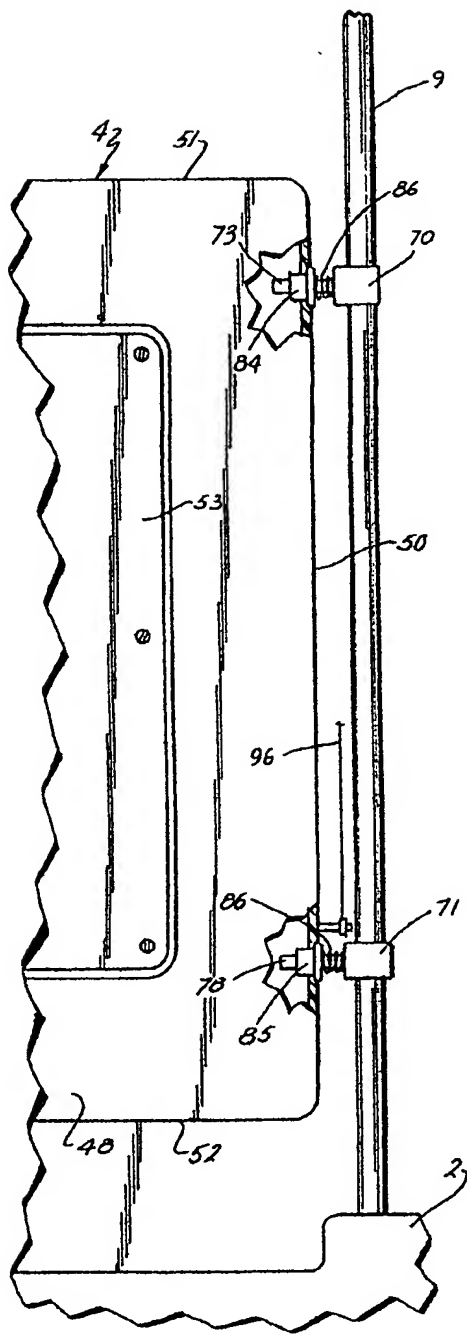


Fig. 3.

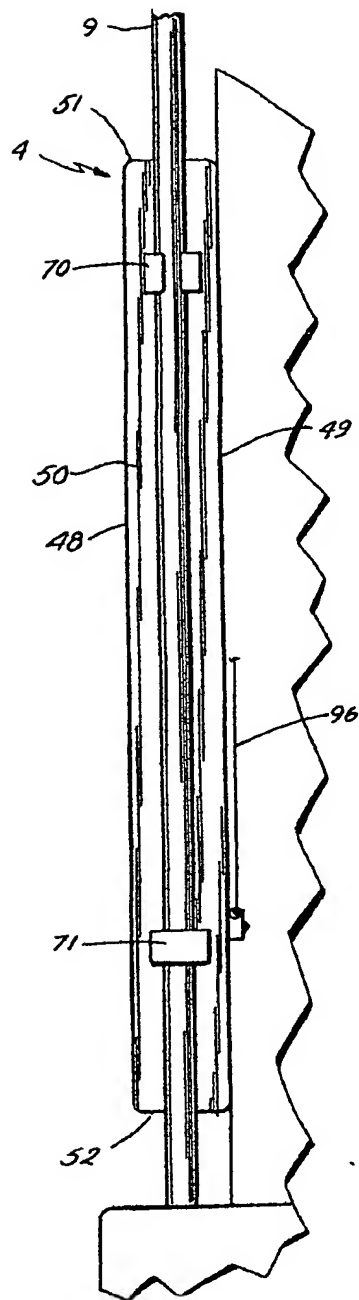
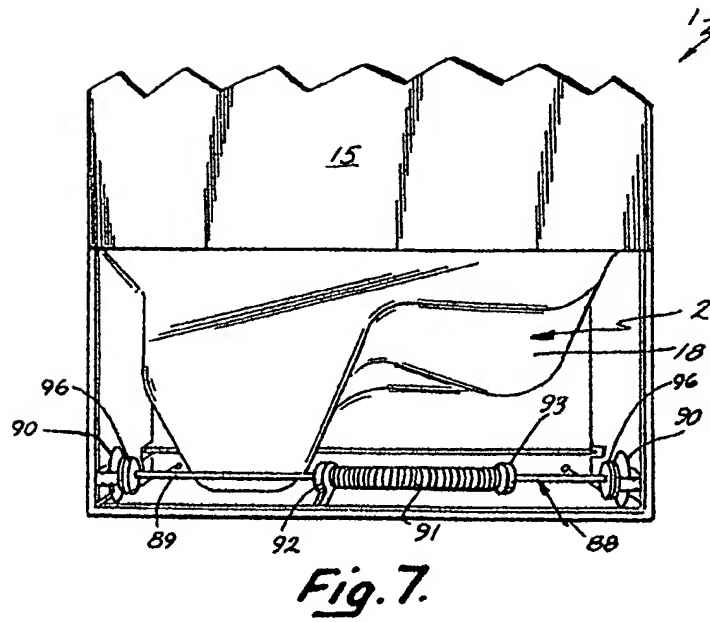
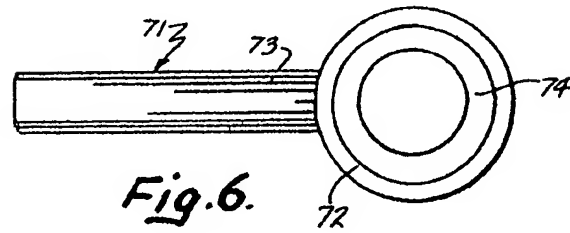
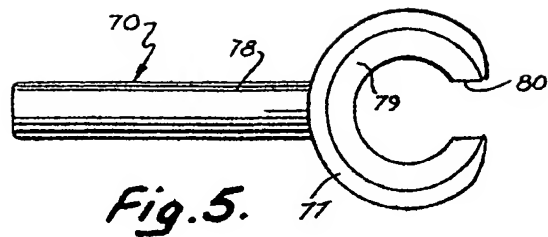


Fig. 4.

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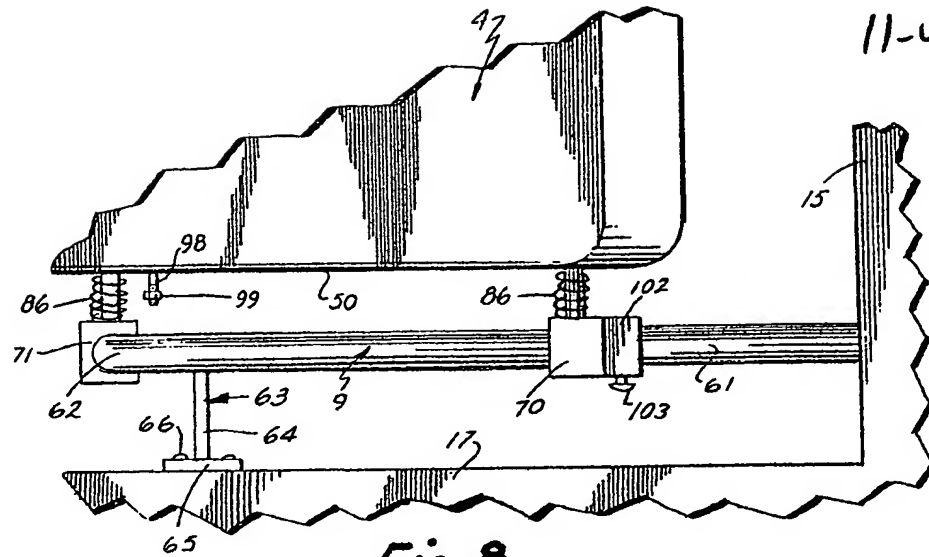


Fig. 8

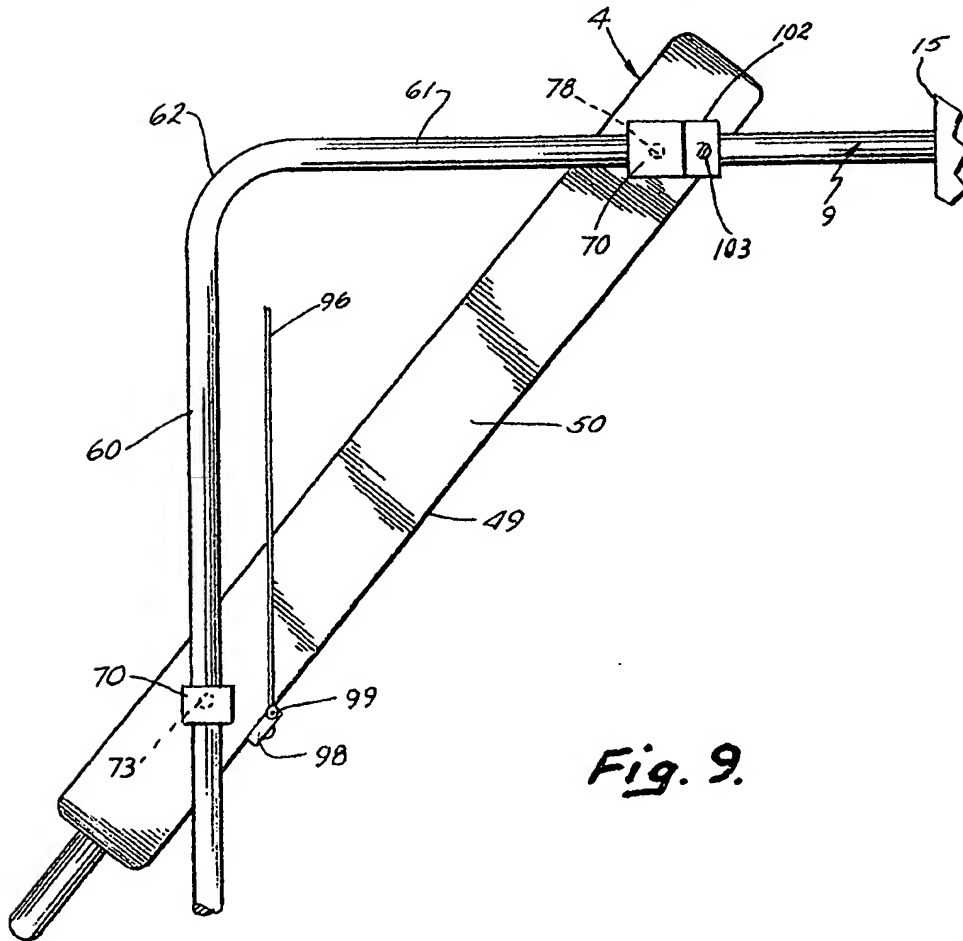
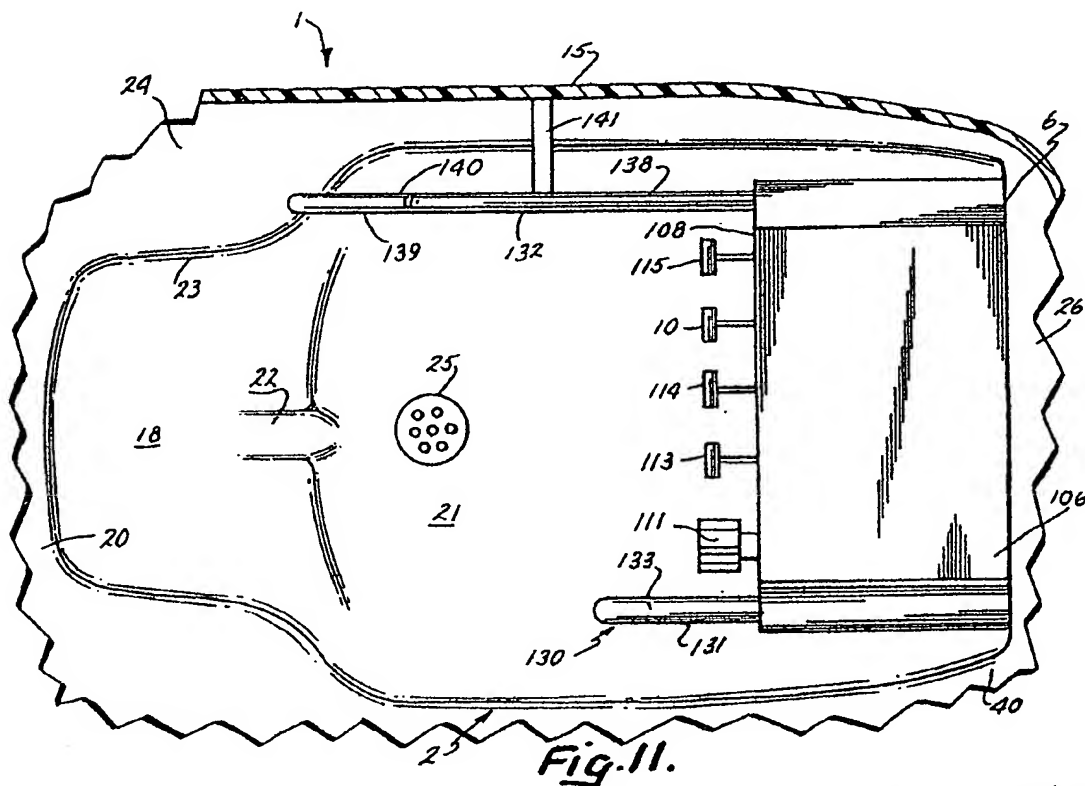


Fig. 9.

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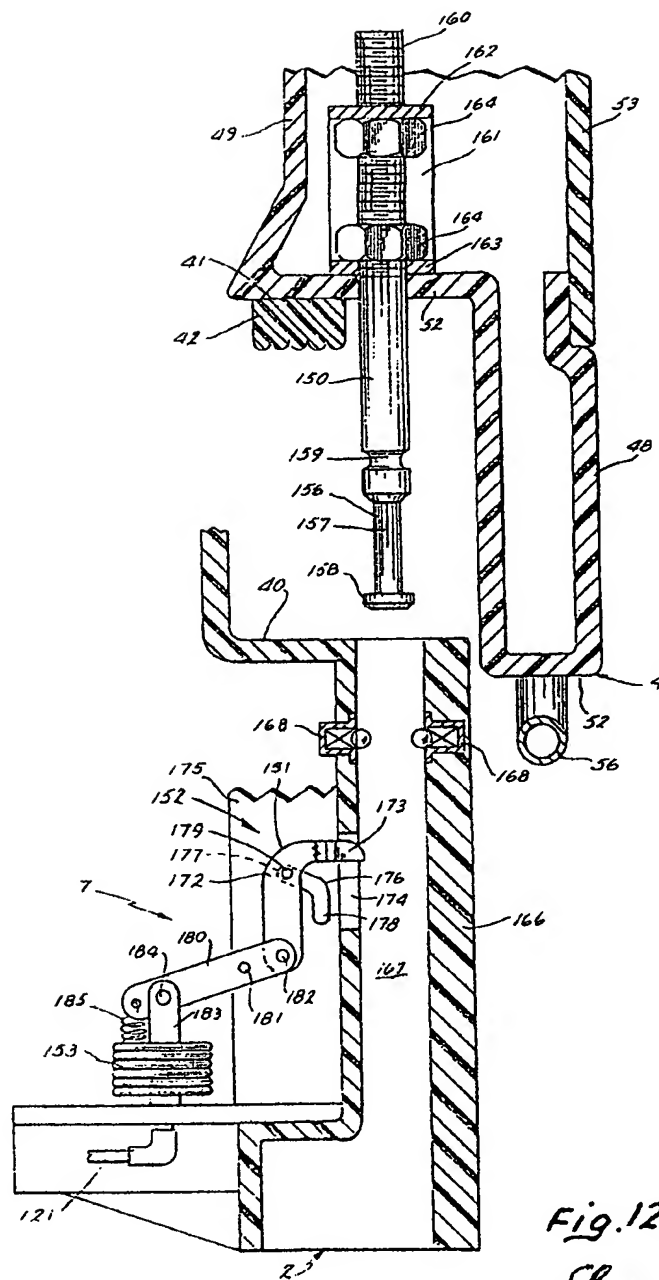
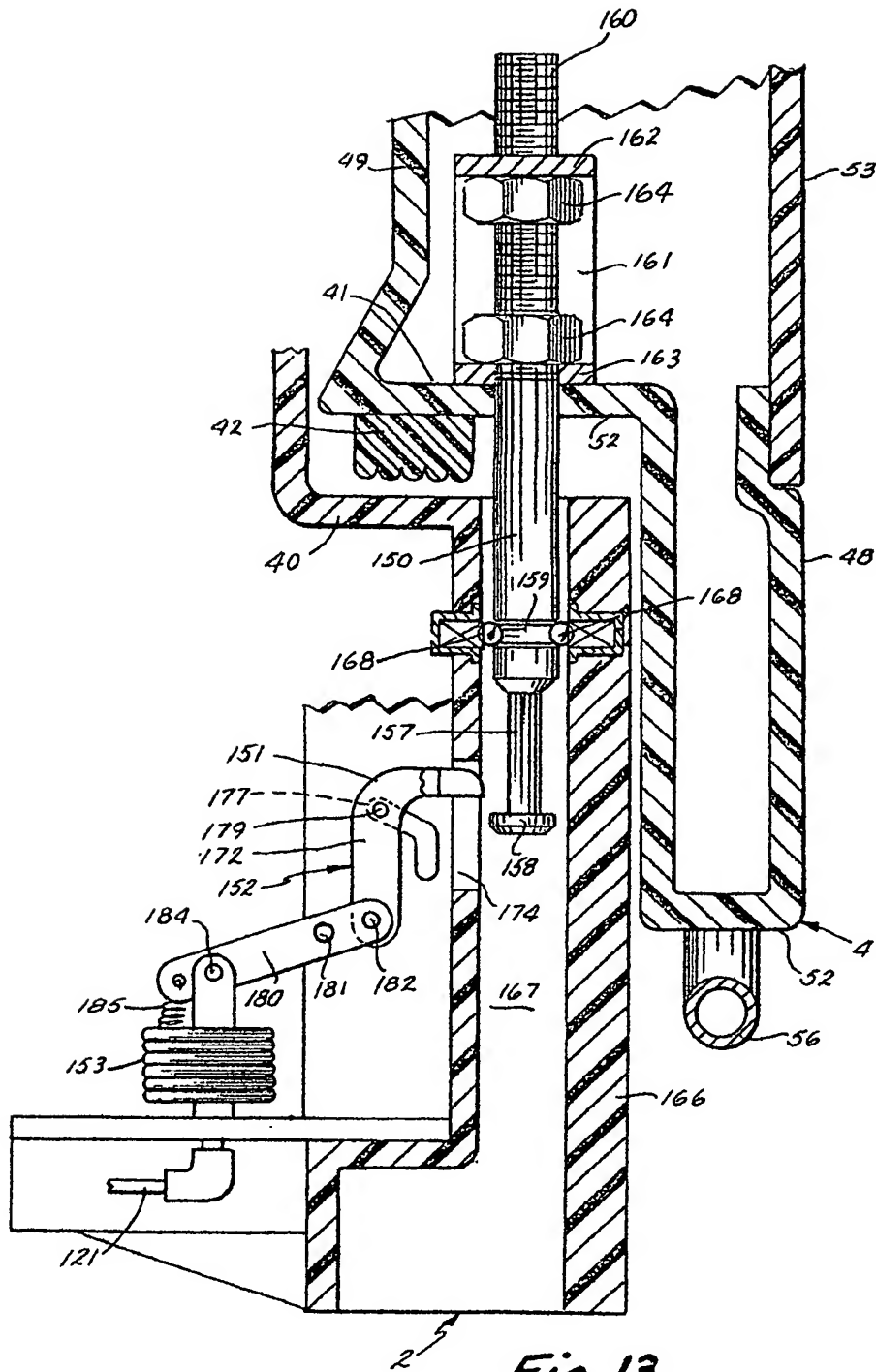
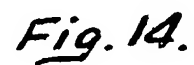


Fig. 12.

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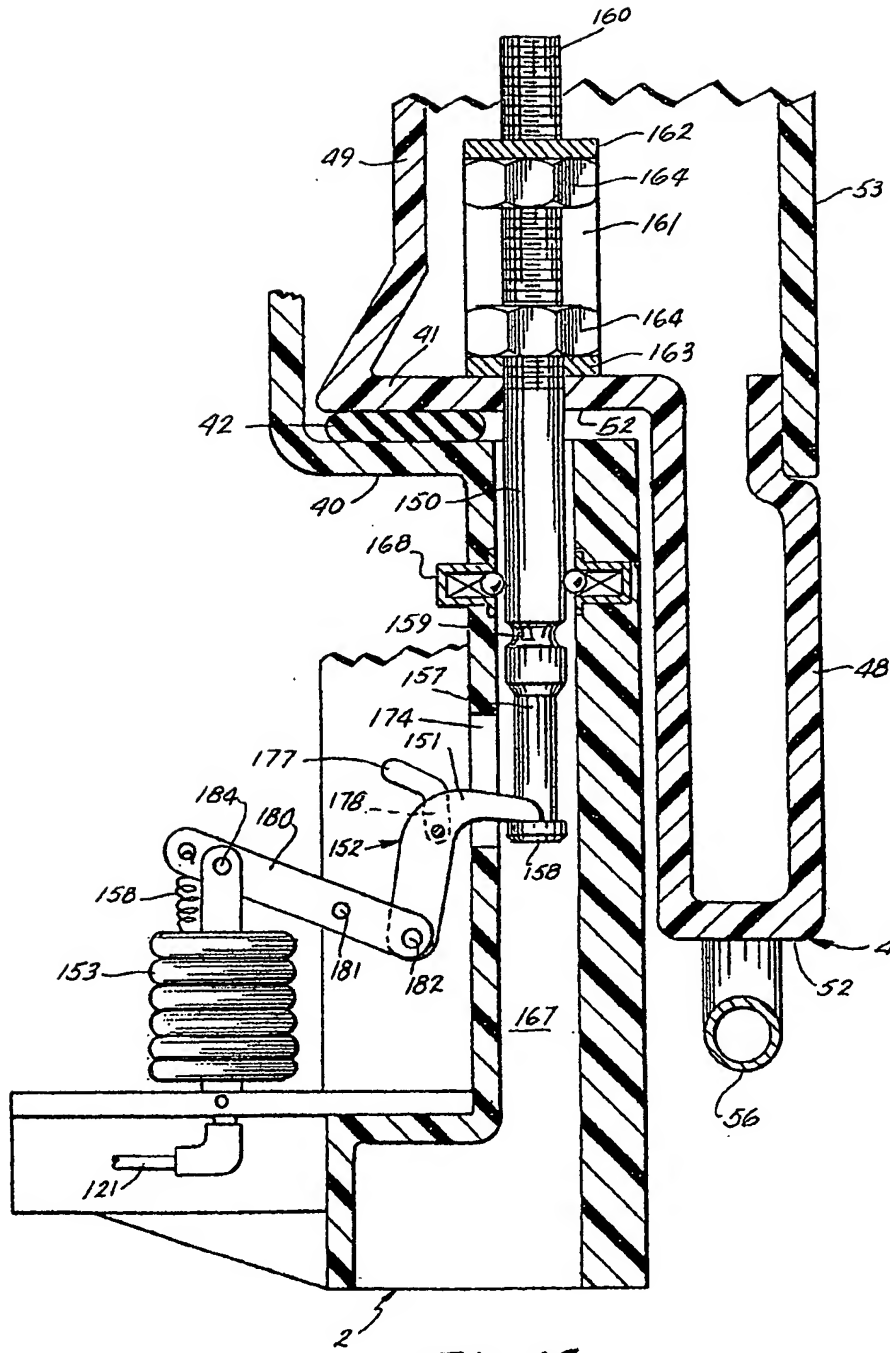
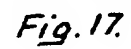
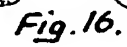


Fig. 15.

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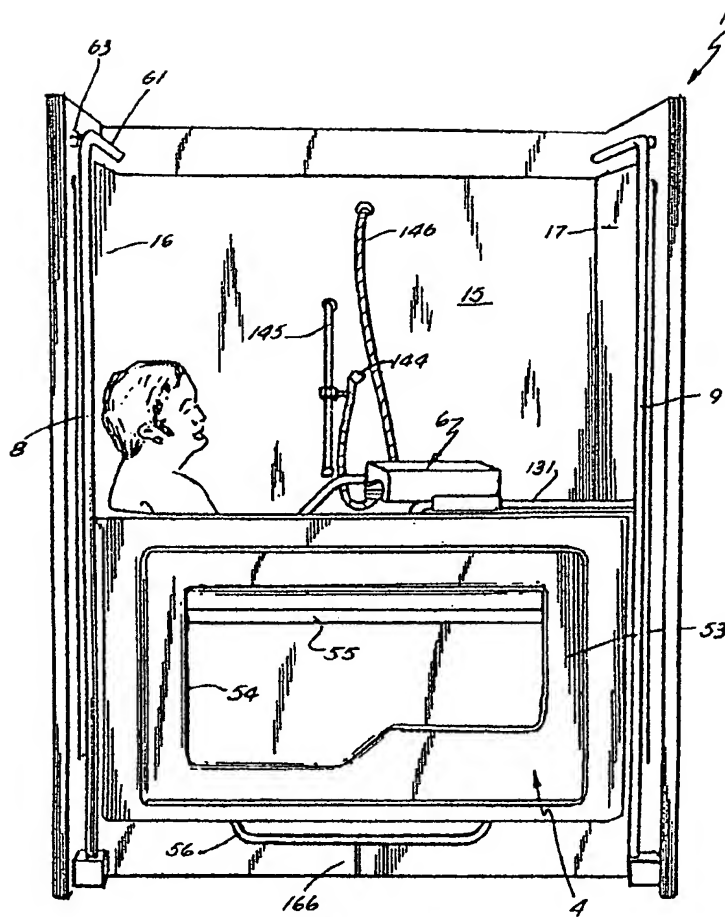


Fig. 18.

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